

Name _____ Period _____

Chapter 45: Hormones and the Endocrine System

Overview

1. What is a *hormone*?
2. Why does a hormone elicit a response only with *target cells*?
3. The body has two long-distance regulating systems. Which involves chemical signals by hormones?
4. What is the other major communication and control system?

Concept 45.1 Hormones and other signaling molecules bind to target receptors, triggering specific response pathways

5. Explain the difference between an *endocrine gland* and an *exocrine gland*. Give an example of each.
6. Several types of secreted signaling molecules are discussed in this chapter. Compare the action of each of the following, and give an example.

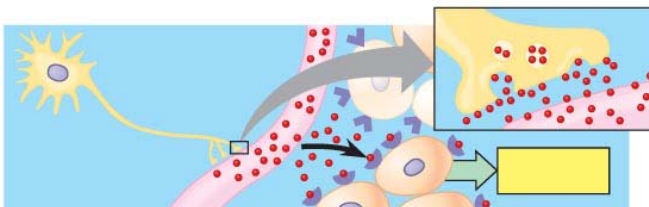
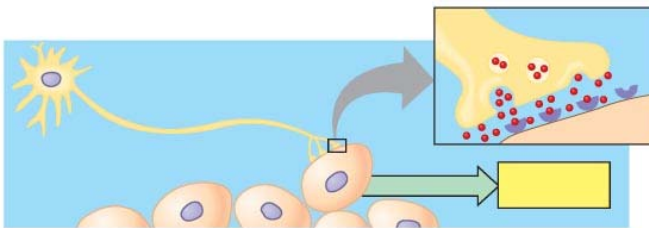
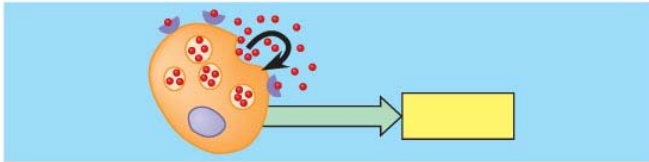
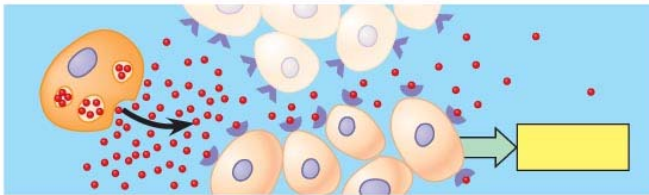
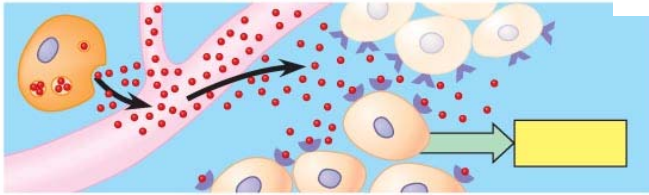
hormones

local regulators

neurotransmitters

pheromones

7. These figures show five different types of signals. Label and explain each one.

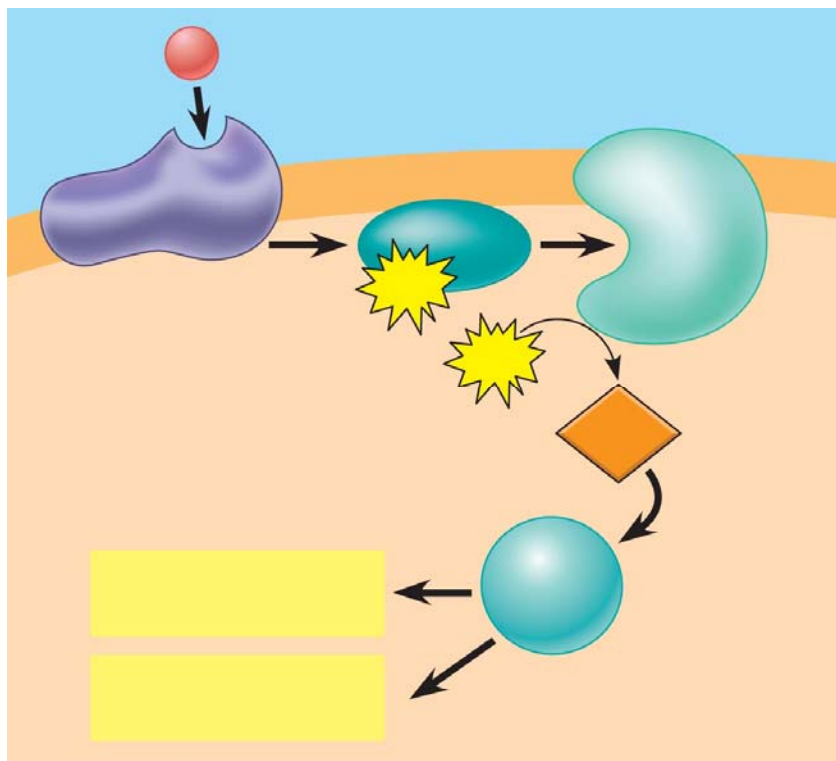


8. Recall that target cells have receptors for specific hormones. Where are the receptors for lipid-soluble hormones found?
9. Where are the receptors for the water-soluble proteins found? Explain this difference for the two types of hormones.

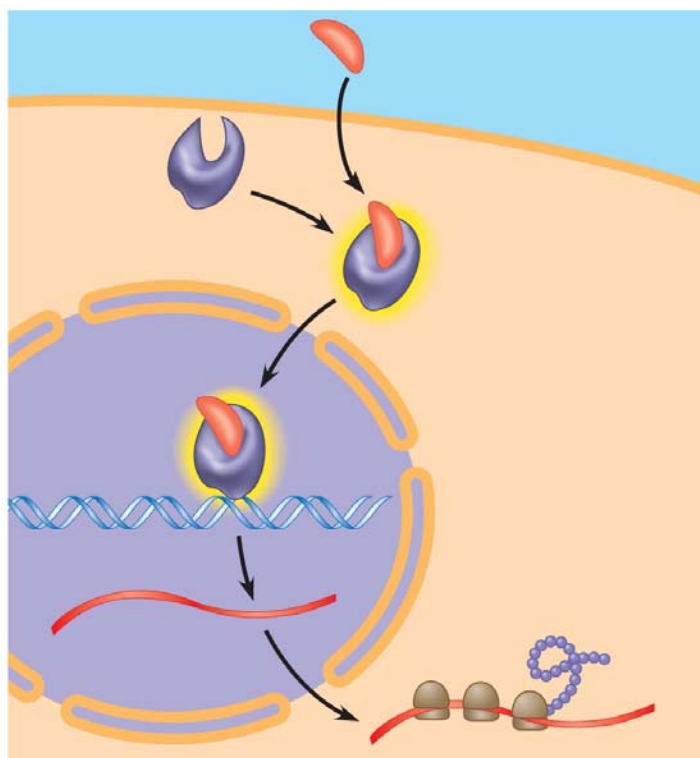
10. Carefully read the section *Cellular Response Pathways*, and use that information to complete this table.

| Hormone Type | Method of Secretion | Mode of Travel in Bloodstream | Location of Receptors | Examples |
|----------------------|---------------------|-------------------------------|-----------------------|----------|
| <i>water-soluble</i> | | | | |
| <i>lipid-soluble</i> | | | | |

11. What endocrine gland secretes *epinephrine*?
12. What are the two intracellular responses in the liver to epinephrine? How do these help the body deal with short-term stress?
13. Use the following figure to explain the *signal transduction* pathway for *epinephrine*. (You may need to review signal transduction in Chapter 11).



14. *Lipid-soluble hormones*, such as estradiol, bind to *intracellular receptors*. Explain the action of this *steroid* in the following figure.



15. One hormone can have several different effects. For example, epinephrine can cause the release of glucose from liver cells, dilate blood vessels to skeletal muscles, and constrict intestinal blood vessels. All these effects prepare the body for “fight or flight.” Explain how these multiple effects are possible.
16. There are some interesting effects of a couple of *local regulators* discussed in your text. Explain how the local regulator *nitric oxide (NOO)* is affected by Viagra, a drug used to treat male erectile dysfunction.
17. Now read about *prostaglandins*, and explain why they contribute to menstrual cramps in females.

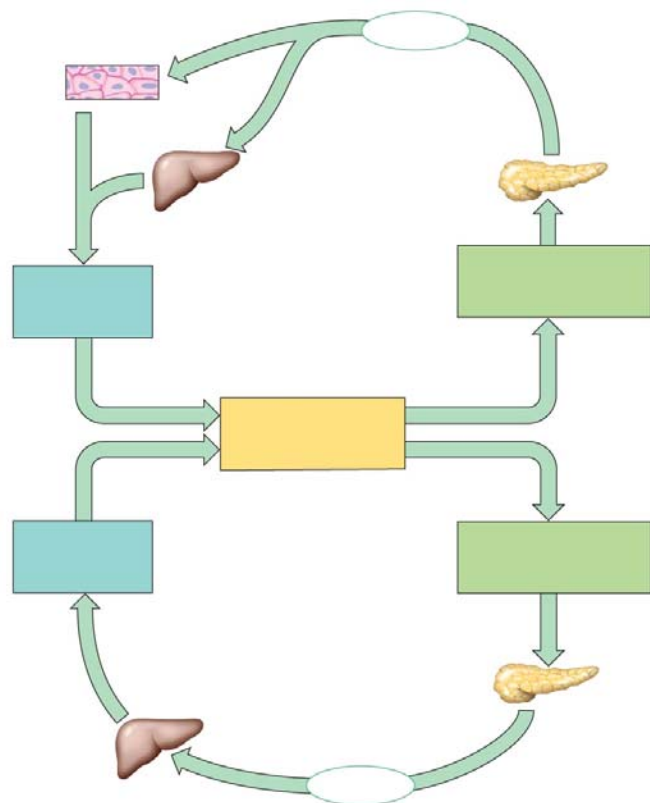
Concept 45.2 Negative feedback and antagonistic hormone pairs are common features of the endocrine system

18. Throughout this course, we have emphasized *feedback loops*. What occurs in a *negative feedback* loop?
19. Complete the following chart for this pair of *antagonistic* hormones.

| Hormone | Secreted by | Action |
|-----------------|-------------|--------|
| <i>insulin</i> | | |
| <i>glucagon</i> | | |

Make sure you specifically noted *alpha cells* or *beta cells* in the chart above.

20. On the AP Biology exam, you will be expected to explain a feedback loop. Use this figure to explain the control of blood glucose by *insulin* and *glucagon*. This is a commonly used example, and one you should know.

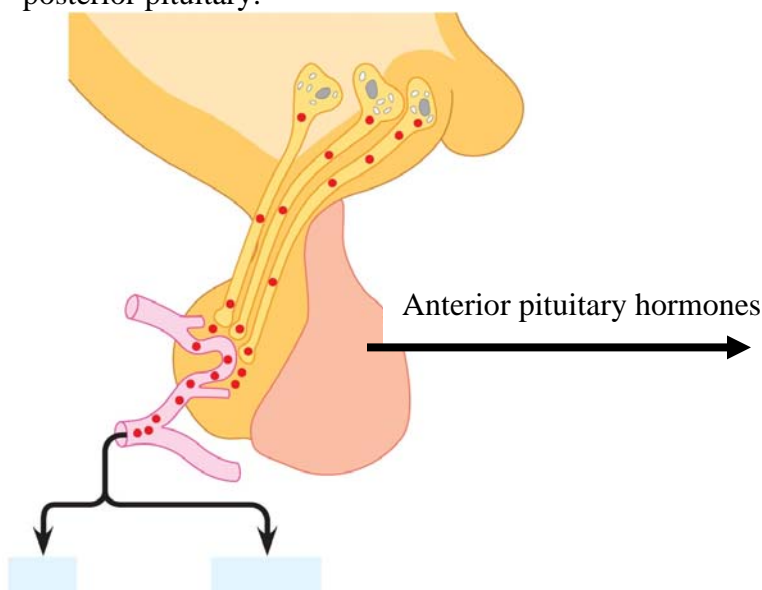


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21. What occurs in *diabetes mellitus*?
22. Distinguish between *type 1 diabetes* and *type 2 diabetes*.
23. Which type of diabetes is correlated with obesity?

Concept 45.3 The endocrine and nervous systems act individually and together in regulating animal physiology

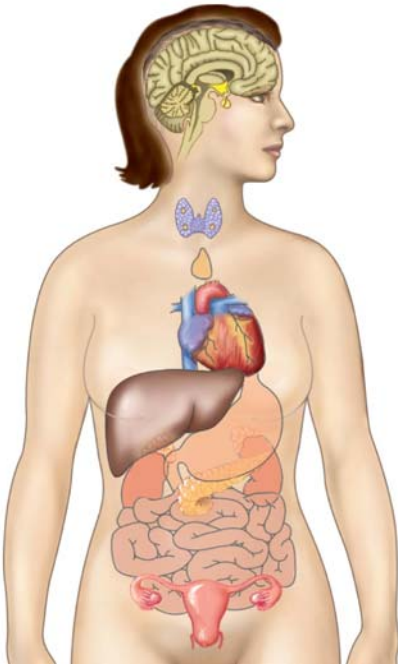
24. The *hypothalamus* directly secretes hormones that travel to the *posterior pituitary* and regulating hormones that affect secretions of hormones by the *anterior pituitary*. On this sketch, label *hypothalamus*, *anterior pituitary*, and *posterior pituitary* and the two hormones secreted from the posterior pituitary.



25. Return to the figure above, and list the hormones secreted by the anterior pituitary.

26. You will find it useful to be able to link hormones with the tissue that secretes them, and know their functions. Pull together the information from this chapter to complete the following chart.

| Hormone | Secreted by | Action and/or Effect of Hypo- or Hypersecretion |
|-----------------------|-------------------------|--|
| <i>growth hormone</i> | | |
| <i>FSH, LH</i> | | |
| <i>TRH</i> | | |
| <i>prolactin</i> | | |
| | thyroid | |
| | parathyroid | |
| | alpha cells of pancreas | |
| <i>insulin</i> | | |
| <i>testosterone</i> | | |
| <i>estradiol</i> | | |
| <i>cortisone</i> | | |
| <i>epinephrine</i> | | |
| <i>aldosterone</i> | | |
| <i>cortisol</i> | | |



27. Let's pull out a few more details from this section. How is *oxytocin* an example of a hormone that is under *positive regulation*?
28. What are *tropic hormones*? Give three examples, and tell what each hormone regulates.
29. What two hormones are antagonistic controllers of blood calcium levels?
30. How does *parathyroid hormone (PTH)* raise blood calcium? (three ways)
31. Why are *glucocorticoids* effective in treating arthritis? What is the problem with their long-term use?

32. The chart you just completed does not cover all the hormones, but it will give you a good start in learning this complex system. To extend this exercise, label the endocrine organs on the figure below and then, next to each organ, list a hormone or hormones secreted by the organ.

Testing Your Knowledge: Self-Quiz Answers

Now you should be ready to test your knowledge. Place your answers here:

1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____